Response to Public Comments Received on September 2009 WaterSense® Draft Specification for Showerheads

March 4, 2010

Background

This document provides the U.S. Environmental Protection Agency's (EPA's) WaterSense program's responses to public comments received on the September 24, 2009 *WaterSense Draft Specification for Showerheads*. The actual comments can be viewed at www.epa.gov/watersense/partners/showerhead_spec.html.

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I. General Specification Comments

Flow Rate Units

a. One commenter requested that the unit flow rate abbreviation used in Section 3.1.1 and Sections 6.1 and 6.2 be changed from "Lpm" to "L/min".

Response: WaterSense agrees with this comment and has updated all references to the liters per minute unit flow rate abbreviation from Lpm to L/min. This change is consistent with the unit flow rate abbreviations used throughout the ASME A112.18.1/CSA B125.1 standard.

Showerhead Energy Use

b. One commenter suggested that the specification address increased energy usage that can occur when a person showering increases the temperature of the water to compensate for heat loss between the showerhead and the user.

Response: WaterSense has determined that increased energy usage from increasing the water temperature to compensate for heat loss between the showerhead and the user is not a significant concern. The spray force and coverage performance requirements associated with the specification should effectively exclude products that have characteristics that might cause the user to significantly increase the temperature of the water. In addition, WaterSense estimates that the user could theoretically increase the hot to cold water ratio by up to 18 percent and still achieve energy savings associated with the overall reduced water consumption of the showerhead (see calculations below).

Assumptions:

- Average actual flow rate for an existing showerhead is 2.22 gallons per minute (gpm)[1] (the average flow rate is less than the standard rated flow rate of 2.5 gpm most likely because the products are rated at 80 pound per square inch (psi), but installed in homes with less pressure).
- Average shower duration is 8.2 minutes[1] and does not change with the installation of a WaterSense labeled showerhead.
- The average person takes 0.67 showers per day.[2]
- There are 2.6 people/household.
- A WaterSense labeled showerhead reduces the flow rate by 20 percent.
- Approximately 73 percent of showerhead water used in a household is hot water.[3]
- Water heating consumes 0.18 kilowatt hours (kWh) of electricity per gallon of water heated assuming:

[1] Peter W. and William B. DeOreo. *Residential End Uses of Water*. Aquacraft, Inc. Water Engineering and Management. American Water Works Association. 1998. Page 102.
[2] Calculated based upon an assumed 17.2 gallons per shower and 11.6 gallons per day for showering. Mayer, Peter W. and William B. DeOreo. Residential End Uses of Water. Aquacraft, Inc. Water Engineering and Management. American Water Works Association. 1998. Page 102.
[3] DeOreo, William B., and Peter W. Mayer. The End Uses of Hot Water in Single Family Homes From Flow Trace Analysis. 2000. Aquacraft, Inc.

- Specific heat of water = 1.0 Btu/lb x º F
- 1 gallon of water = 8.34 lbs
- 1 kWh = 3,412 Btus
- Incoming water temperature is raised from 55º F to 120º F (Δ 65 º F)
- Water heating process is 90 percent efficient for electric hot water heaters

Energy Use per Household for a Standard Showerhead:

2.22 gallons/min (gpm) * 8.2 min/shower * 0.67 showers/person/day * 2.6 people/house 365 days/yr * 0.73 (% hot water) * 0.18 kWh/gal * = **1,521 kWh/house/yr**

Energy Use per Household for a 2.0 gpm WaterSense Labeled Showerhead:
(assuming no additional increase in hot water use)

(2.22 gpm - (2.22 gpm *0.2)) * 8.2 min/shower * 0.67 showers/person/day * 2.6 people/house 365 days/yr * 0.73 (% hot water) * 0.18 kWh/gal * = **1,217 kWh/house/yr**

Energy Use per Household for a 2.0 gpm WaterSense Labeled Showerhead:
(assuming percent hot water is increased to 91%)

(2.22 gpm - (2.22 gpm *0.2)) * 8.2 min/shower * 0.67 showers/person/day * 2.6 people/house 365 days/yr * **(0.73 + 0.18)** (% hot water) * 0.18 kWh/gal * = **1,517 kWh/house/yr**

Consumer Satisfaction

c. One commenter encouraged WaterSense to conduct a consumer satisfaction survey in the future to evaluate customers' acceptance of WaterSense labeled showerheads.

   Response: WaterSense receives and tracks consumer feedback via the WaterSense Helpline and will utilize this feedback as a mechanism to evaluate customers' acceptance of WaterSense labeled showerheads. This feedback will also inform future updates to the WaterSense specification for showerheads.

Performance Testing

d. One commenter asked if showerheads with flow rates other than 2.0 gpm would need to meet all other performance criteria.

   Response: Any showerhead that meets the flow rate requirement of less than or equal to 2.0 gpm must also meet all other performance criteria contained in the specification in order to earn the WaterSense label.

Testing Cost

e. One commenter was concerned about the costs small business manufacturers would incur from having their products tested. The commenter asked if the test would be performed once or multiple times in order to determine the cost associated with testing products.

Response: During the development of its product certification system (www.epa.gov/watersense/partners/certification.html), EPA considered the impact on smaller manufacturers and worked to balance the cost and burden of the process with the rigor the program needs to maintain the WaterSense label's integrity. WaterSense does require the manufacturer to certify their products initially in order to earn the WaterSense label. In addition, EPA requires a portion of the labeled products to be retested annually in order to confirm their ongoing conformance to the WaterSense specification.

While there will be some cost impact on all manufacturers to submit a product for certification, the strength of the WaterSense label should help products stand out in the marketplace. This should be of particular value to small business partners.

In addition, the specific cost structure for product certification is determined by EPA's licensed certifying bodies. EPA anticipates that the testing fee and cost for certification of products, which may include opening a new certification file or adding models to an existing file, will be in line with the current cost structure to have showerheads certified by an accredited certifying body.

Thermal Shock and Scalding

f. One commenter urged EPA to continue evaluating the potential for thermal shock for showerheads flow rates less than 2.5 gpm until definitive research confirms or denies the risks before WaterSense proceeds with labeling showerheads.

Response: WaterSense and the American Society of Mechanical Engineers (ASME)/Canadian Standards Association (CSA) Joint Harmonization Task Force evaluated the link between flow rate and temperature deviations associated with pressure and temperature changes. The task force gathered and presented data to compare the temperature profiles that result from a drop in hot and cold water pressure for both standard and high-efficiency showerheads under the two risk scenarios: (1) installation with various types of automatic-compensating mixing valves (thermostatic, pressure balancing, or combination) designed for a flow rate of 2.5 gpm at 45 psi, and (2) installation without the protection of an automatic-compensating mixing valve. The data showed that the risks are present for showerheads of all flow rates, but that more efficient showerheads are more sensitive to sudden changes in water pressure. As a consequence, temperature change in water exiting the shower may be amplified when the pressure within the cold water or hot water supply plumbing changes suddenly.

Ultimately, WaterSense and the task force came to the conclusion that the thermal shock and scalding risks and control cannot be fully addressed through the design of the showerhead, and thus adequately affected by the specification criteria. The hot water temperature exiting the showerhead is affected by the interrelated nature of the plumbing system including the showerhead, mixing valve, and hot water delivery system. Industry is currently working to harmonize automatic compensating mixing valve standards and showerhead standards, to address incompatibilities of these plumbing system components. This will go a long way toward addressing the risks of thermal shock and scalding associated not only the installation of a WaterSense labeled

showerhead, but all showerheads, particularly in new construction. In addition, WaterSense is requiring the manufacturers to mark the product packaging with the minimum flow rate at 45 psi as determined by testing at that pressure. This is a vital step toward providing the information necessary to "match" the showerhead with a compatible automatic-compensating mixing valve that is rated to provide protection at the same flow rate and tested pressure.

Trickle Valve

g. One commenter requested that WaterSense consider the costs and benefits of including trickle valves [a valve that can be activated to temporarily reduce the flow rate of the showerhead to a trickle, used to save water when waiting for the water to get hot or for turning down the water while soaping up] in a future revision to the specification. The commenter stated that trickle valves could increase water savings by allowing the user to take personal action to further reduce the flow rate of their showerhead for periods of time. The commenter urged WaterSense to facilitate the use of trickle valves since operating the valves can offer significant water and energy savings. However, the commenter urged WaterSense to evaluate the significance of pressure differences when the showerhead is in trickle mode that can lead to some hot water flowing into the cold water distribution system.

   Response: WaterSense is not specifically requiring trickle valves because to do so would be design restrictive to manufacturers. In addition, WaterSense has not gathered data to evaluate the actual water and energy savings of the valves or their impact on the plumbing system and potential health and safety issues. WaterSense realizes that these valves can achieve additional water and energy savings, thus WaterSense and the task force did carefully consider the language to ensure that showerheads with trickle valves would not be excluded by the specification. These valves remain a design option for manufacturers who choose to make products that exceed WaterSense's criteria.

II. Comments on Section 1.0 – Scope and Objective

Clarification of Showerhead Term

a. One commenter suggested including hand-held devices in the clarification of the term showerhead, eliminating the need to mention hand-held devices multiple times throughout the specification.

   Response: WaterSense agrees with this comment and has updated the specification to reflect this change (see Section 1.0).

b. One commenter encouraged WaterSense to co-label showerheads with ENERGY STAR. The commenter stated that this specification is an excellent candidate for co-labeling and that both programs have their own network or practitioners and stakeholders and that where a common specification can save both water and energy while maintaining user satisfaction, EPA's investment in specification development should be made available to both programs. In addition, the WaterSense product

certification system will support the achievement of both water and energy savings for these products.

Response: The WaterSense and Energy Star programs strive to coordinate on water and energy using products. However, each program decides where and how to expend its resources. At this time, showerheads shall only be eligible for the WaterSense label.

III. Comments on Section 2.0 – General Requirements

Instructions for Overriding the Maximum Flow Rate

a. One commenter expressed concern about manufacturers' ability to place highly visible instructions on packaging that instruct the consumer on how to remove flow restrictors to clean the fixture. Such instructions may allow sale of products that defeat the intended flow rate. The commenter suggested that WaterSense include at the end of the paragraph in Section 2.3 of the specification, "WaterSense reserves the right to review the content and placement of all instructions and to revoke the use of the label for any showerhead carrying instructions that appear to promote the opportunity or possibility of operating the product above the maximum rated flow."

Response: WaterSense has determined that the current specification language is sufficient to address the concern regarding the ability of manufacturers to instruct consumers on how to override the intended maximum flow rate of the showerhead. The licensed certifying body, as part of the certification process, will review product packaging and instructions to ensure that the showerhead meets these criteria. If such marking or instructions are discovered and the problem is not corrected to the certifier's satisfaction, the showerhead would not receive the WaterSense label. In addition, as specified in the WaterSense program guidelines and product certification system, WaterSense reserves the right to suspend or withdraw the use of the WaterSense label if the product is found not to conform to the relevant specification or the WaterSense label use guidelines.

IV. Comments on Section 3.0 – Water-Efficiency Criteria

Pressure Units

a. One commenter suggested that pressure should be specified in units of pounds per square inch gauge (psig), as there can be a misunderstanding between absolute pressure and gauge pressure. Specifically, the commenter pointed out that if the pressure was not specified in psig, a manufacturer could meet the maximum flow rate requirement of 2.0 gpm at 80 psi with an instrument reading in absolute pressure, which is 14.7 psi higher than an instrument reading in psig.

Response: Although specifying pressure in units of psig is more accurate, WaterSense has determined that specifying pressure simply in terms of psi is common practice and is consistent with how pressure is specified in the existing plumbing standards, including ASME A112.18.1/CSA B125.1. In addition, manufacturer and certifying body members of the task force indicate that it is uniformly understood that psi means gauge pressure in

this context. In maintaining consistency with existing standards, WaterSense has decided not to change the specification units for pressure.

Specifying Temperature for Flow Rate Test

b. One commenter suggested adding a temperature requirement to Section 3.1.1, specifically, "with water flowing at 38+/- 6°C (100+/-10°F) and maintained for one minute." The commenter noted that this could be covered by the ASME A112.18.1/CSA B125.1 standard's reference to testing, but it may be better reinforced in the WaterSense specification.

Response: WaterSense consulted with the task force and decided not to make this recommended change. Specifically, because the specification references the testing procedures outlined in the ASME A112.18.1/CSA B125.1 standard, adding this requirement to the WaterSense specification would be redundant. In addition, if the temperature requirement was modified in the standard, the WaterSense specification requirements would automatically become outdated.

V. Comments on Section 4.0 – Spray Force Criteria

Clarifying Where Pressure Is Measured

a. One commenter suggested adding "of the shower arm" after the word "inlet" to better define where the pressure is measured.

Response: WaterSense consulted with the task force and decided not to make this recommended change. Specifically, the flowing pressure is measured into the showerhead, not into the shower arm. In addition, the term shower arm is undefined and ambiguous. The intent is to isolate the pressure flowing into the device.

VI. Comments on Section 5.0 – Spray Coverage Criteria

Spray Coverage Requirements

a. Two commenters suggested establishing a different set of criteria for spray coverage. The commenters evaluated the laboratory and consumer data under several scenarios to come up with two proposals.

Proposal 1:
5.1.1 The volume of water collected in the 50 mm (2 in) ring shall lie within the range 5% and 35% of the total volume of water collected.
5.1.2. The volume of water collected in the 100 mm (4 in) ring shall lie within the range 10% to 70% of the total volume of water collected.
5.1.3 The volume of water collected in the 150 mm (6 in) ring shall lie within the range 10% to 70% of the total volume of water collected.

Proposal 2:
5.1.1 The volume of water collected in the 100 mm (4 in) ring shall lie within the range 10% to 70% of the total volume of water collected.

5.1.2. The volume of water collected in the 150 mm (6 in) ring shall lie within the range 10% to 70% of the total volume of water collected.
5.1.3 The volume of water collected in the 200 mm (8 in) ring shall lie within the range 10% to 35% of the total volume of water collected.

Response: WaterSense and the task force evaluated both of these proposals and determined that at this time, changes to the coverage criteria are not warranted. The intent of these criteria is simply to exclude products that have spray patterns with a hollow spot in the center or that have too much water flowing in the center to form a very narrow beam. While the criteria proposed above use more refined mechanisms to achieve the same objective, by more narrowly defining the showerhead coverage criteria they may potentially exclude products that some consumers would find acceptable. As showering is a very personalized experience and users have a wide variety of preferences, WaterSense's goal in designing the specification criteria is not to define the "perfect showerhead," but to exclude those products that have characteristics that most users would find to be unsatisfactory.

VII. Comments on Section 6.0 – Flow Rate Marking

Section Name

a. One commenter suggested that the title of Section 6.0 be changed to from "Flow Rate Marking" to "Marking." The commenter made suggestions for additional marking requirements that would necessitate the title to be more broad.

Response: WaterSense agrees with this comment and has changed the section title to "Marking," as the marking requirements are broader than just flow rate.

Additional Marking Requirements

b. One commenter suggested adding "the manufacturers' identification" to Sections 6.1 and 6.2 as a required marking along with the flow rate.

Response: WaterSense has decided not to specify the manufacturer's identification as a marking requirement because this term is not defined. However, WaterSense has determined that there are other marking requirements that should be included and that are identified and defined in the ASME A112.18.1/CSA B125.1 standard. Therefore, WaterSense has added to Section 6.0 the qualifying statement:

> "In addition to the marking requirements in ASME A112.18.1/CSA B125.1 the following markings shall apply:"

c. One commenter suggested adding a new requirement that "Product packaging shall be marked with the flow rate value at 45 psi as verified by testing."

Response: WaterSense agrees with this comment and has moved this section requirement from Appendix C to Section 6.0. Discussions with the task force indicated

that this marking requirement is not optional, but is persuasive and thus needs to be included in the main body of the specification.

VIII. Comments on Appendix A: Spray Force Procedure

Section A2.2 Force Balance Method

a. One commenter suggested that the performance requirement from the setup section in A2.2(e), *"The showerhead spray force exceeds the minimum force specified in Section 4.1 when the fixture rotates within 0.1° of zero or past it."* be incorporated into Section A2.5(f) because it is more logically located at the end of the test procedure. In addition, the commenter suggested replacing the word "exceeds" with the word "meets," since meets is acceptable also.

   Response: WaterSense agrees with these comments and for clarification purposes, has moved this requirement to Section A2.5. In addition, WaterSense has replaced the word "exceed" with the term "meets," as "meets" is also an acceptable outcome.

b. One commenter suggested replacing the phrase "rotation of the balance" in Section A2.2(a) with "rotation of the target."

   Response: WaterSense disagrees with this suggested change because the term "target" denotes the actual target face plate, which is not the only component that rotates. WaterSense does recognize the need to clarify where the rotation should be measured, thus WaterSense has revised Section A2.2(a) to read "The force balance fixture must have a means for measuring the rotation from the point of balance."

c. One commenter suggested adding the term "fixture" after "the force balance" in Section A2.2(b).

   Response: WaterSense agrees with this comment and has updated Section A2.2(b) to read " The force balance fixture must be calibrated…"

d. One commenter suggested replacing the term "fixture" with the word "target" in Section A2.2(e) [now Section A2.5(f) in the final specification].

   Response: WaterSense disagrees with this suggested change because the term "target" denotes the actual target face plate, which is not the only component that rotates.

Section A2.3 Force Balance Calibration

e. One commenter suggested adding the phrase "to the horizontal" after "at a 45±1° position" in Section A2.3(a).

   Response: WaterSense agrees that it should clarify that the zero angle is established at 45±1° to the horizontal, thus has updated Section A2.3(a) to read: "Establish the zero angle position when the target is at 45±1° to the horizontal and the fixture is at a point of balance."

f. One commenter suggested replacing the term “in perpendicular contact with” in Section A2.3(b) with “perpendicular to.”

Response: WaterSense disagrees with this comment because the force gauge must be in contact with the center of the target. Specifying that it must be perpendicular to the target is not specific enough.

g. One commenter suggested referring to Section 4.1.1 instead of Section 4.1 in Section A2.3(f).

Response: WaterSense agrees with this comment and has updated Section A2.3(e) (changes to the specification resulted in the renumbering of sections, thus Section A2.3(f) is now A2.3(e) in the final specification) to reference Section 4.1.1. The reference to the force requirement should point back to the more specific section of the specification.

h. One commenter suggested removing Sections A2.3(c), (g), and (h).

Response: WaterSense agrees that these requirements are unnecessary and that their purpose was to serve as a double check of the calibration. WaterSense has removed these requirements from the specification.

i. One commenter suggested adding to Section A2.3 the requirement: “Target shall move more than “x” to verify the force balance fixture is working properly.”

Response: WaterSense has decided not to accept this comment. Its purpose would also serve as a check on the calibration, however, the exact amount that the force balance fixture must move is undefined and could be variable.

Section A2.4 Other Test Conditions

j. One commenter suggested removing Sections A2.4(a), (b), and (c) and replacing them with “install the device as in Figure 1.”

Response: WaterSense disagrees with removing these sections because, although the procedures for measuring pressure and flow rate is specified in the ASME A112.18.1/CSA B125.1 standard, their application to this new force test needs to be specified. WaterSense does, however, agree that a more detailed figure would provide additional clarification, thus WaterSense has revised Figure 1 to show the specific installation conditions.

Section A2.5 Test Procedure

k. One commenter suggested adding the phrase “the showerhead may be pivoted, while maintaining the 18-inch spacing” to Section A2.5(c).

Response: WaterSense disagrees with this comment because it will be not be practical or possible to readjust the showerhead to maintain the 18-inch spacing once the water

flow has been initiated, as the target will move. Simply readjusting the showerhead so the center of the spray aligns with the target also simulates what a person would do in real life once the shower is turned on. WaterSense has determined that the current adjustment requirement is sufficient.

l. One commenter suggested adding the phrase “evaluate and verify that the target rotates to zero or past it” to Section A2.5(f).

Response: WaterSense agrees that clarification for when the showerhead meets the minimum force criteria is necessary and has updated Section A2.5(f) to read: “The showerhead spray force meets the minimum force specified in Section 4.1 when the fixture rotates within 0.1° of zero or past it.”

m. One commenter suggested adding a new Section A2.5(g) Record if pass or fail.

Response: WaterSense agrees with this comment and has added a requirement Section A2.5 to record if the showerhead passes or fails.

Figure 2 Force Balance Test Apparatus

n. One commenter suggested adding “Angle Meter” to the 0.0±0.1° block in Figure 2.

Response: WaterSense agrees that identifying the angle meter would provide clarification and has updated Figure 2 to reflect this change.

IX. Comments on Appendix B: Spray Coverage Procedure

B2.1 Setup

a. One commenter suggested removing B2.1(c).

Response: WaterSense disagrees with this comment. Although the requirement to connect a pipe or tubing of the same nominal size as the fitting connections is specified in the ASME A112.18.1/CSA B125.1 standard, its application to this new coverage test needs to be specified.

B2.2 Other Test Conditions

b. One commenter suggested removing B2.2(a), (b), (c), and (d) and replacing them with a figure and instructions explaining how to install the device.

Response: WaterSense disagrees with removing these sections because, although the procedures for measuring pressure and flow rate is specified in the ASME A112.18.1/CSA B125.1 standard, their application to this new coverage test needs to be specified. However, WaterSense does agree that a more detailed figure would provide additional clarification; thus, WaterSense has revised Figures 4 and 5 to show the specific installation conditions.

B2.3 Test Procedure

c. One commenter suggested adding a standard deviation of ±7 kilopascals (kPa) (1 psi) for the pressure stabilization in B2.3(c).

Response: WaterSense agrees with this comment and has updated Section B2.3(c) to include a 7 kPa (1 psi) standard deviation for the pressure stabilization.

d. One commenter suggested removing B2.3(e) and (f) and then renumbering B2.3(g) as B2.3(e) and rewording it to read "collect, measure, and record the volume of water in each annular ring." The commenter also suggested adding a new B2.3(f) to read "determine the total volume collected in all rings."

Response: WaterSense has determined that the requirements as proposed in the draft specification are necessary to accurately convey the test procedure, however, WaterSense has modified the language slightly in Sections (g), (h), and (i) to add clarification.

e. One commenter suggested rewording section to B2.3(h) to read "calculate and record the percentage of the total recorded volume collected in each ring."

Response: WaterSense agrees with this comment and has modified Section B2.3(i) [changes to the specification resulted in the renumbering of sections, thus Section B2.3(h) is now B2.3(i) in the final specification] to read: "Calculate and record the percentage of the total recorded volume collected in each ring."

f. One commenter suggested removing B2.3(i) and replacing it with "Evaluate and verify that the spray coverage lies within the ranges specified in Section 5.1."

Response: WaterSense disagrees with removing Section B2.3(j) [changes to the specification resulted in the renumbering of sections, thus Section B2.3(i) is now B2.3(j) in the final specification]. Task force members did indicate that this verification of the volume collected to the total volume calculated is unnecessary and that the ± 5 percent deviation requirement is arbitrary. However, WaterSense indicated and the task force agreed that this requirement is useful in terms of verifying that the test was executed properly and that a majority of the water was captured and accounted for. WaterSense and the task force also agreed that this should not be a requirement that determines whether at showerhead passes or fails the coverage test, but merely a check on the test procedure. As a result, WaterSense has clarified that if the volume varies beyond ± 5 percent, the test procedure is to be corrected and repeated and the results of the difference between theoretical and actual volume recorded for future reference, should a question arise regarding the validity of the test results.

Regarding the second part of the comment, WaterSense has decided not to change "Evaluate and verify that the spray coverage meets the minimum and maximum values specified in Section 5.1." to "Evaluate and verify that the spray coverage lies within the ranges specified in Section 5.1." This change only makes sense if the coverage criteria were changed to reflect a range for compliance. Since the coverage criteria was not revised, WaterSense did not revise Section B2.3(k) as proposed (changes to the

specification resulted in the renumbering of sections, thus Section B2.3(j) is now B2.3(k) in the final specification).

g. One commenter suggested clarifying how water is to be collected for the measurement of volume in each annular ring in B2.3(g). The commenter stated that it is unclear whether there is a tap in each ring, whether each ring drains thoroughly enough during a reasonable period of time to provide accurate and reproducible values, or whether the rings contain some interior marking to allow for measurement of water without the need to drain the apparatus.

Response: WaterSense purposefully did not specify how the water is to be collected, as this is dependent upon the test equipment used, and is left up to the discretion of the licensed certifying body. The requirements that are included are sufficient to ensure that the results are reproducible and repeatable despite differences in equipment used and the specific techniques for measuring water volume. However, WaterSense has revised Figures 4 and 5 to provide more detail regarding the test equipment and setup.

Figure 4 Annular Ring Specifications

h. One commenter suggested removing the excess rings greater than 8 inches in size in Figure 4.

Response: WaterSense agrees that the volume of water collected in the rings beyond 6 inches are not used individually in the assessment of whether or not a showerhead meets the coverage criteria (only the sum total volume collected in these ring segments are used in the calculation of the percent volume in the 2-, 4-, and 6-inch rings). WaterSense has revised Figure 4 to show that separating the annular ring gauge into individual ring segments beyond 6 inches out to 20 inches is unnecessary (the optional segmentations are identified by red dotted lines), provided that a total combined volume collected in those ring segments can still be measured.

X. Comments on Appendix C: Informative Annex for WaterSense Labeling

Appendix Title

a. One commenter recommended moving the provisions of this section to the main body of the specification, or at a minimum, removing the word “Informative” from the title of this appendix. The commenter suggested that the term “informative” connotes that the content of the appendix is optional. The commenter went on to state that these labeling provisions, including the marking of the minimum flow rate at 45 psi, are important and should carry the same force as the other provisions listed in the main body of the specification.

Response: WaterSense agrees that the appendix title “Informative Annex for WaterSense Labeling” is misleading, as the criteria contained in the Annex are in fact mandatory in order for the product to be certified to receive the WaterSense label. To

clarify the intent of this appendix, WaterSense has changed the title to "Appendix C: Requirements for WaterSense Labeling."

WaterSense does not agree that the entire contents of this section need to be included in the main body of the specification. Although these are mandatory requirements for the label to be used on the product, they are not directly related to the product's ability to conform to the specification.
WaterSense does, however, agree that the additional marking requirements are equally important as other requirements, and has moved the additional marking requirements (previously in Section 2.0 of Appendix C in the draft specification) to Section 6.0 of the final specification. WaterSense wanted to make clear that the manufacturer is required to mark the package with the minimum flow rate at 45 psi in order for the product to conform to the specification, and thus this section needs to be included in the main body of the specification.

Additional Marking Requirements

b. One commenter suggested that Appendix C, Section 2.0 regarding the marking of the minimum flow value rate be removed, because minimum flow rates are not typically specified by manufacturers, thus the minimum flow rate is never verified. Further the commenter indicated that this marking requirement was deleted by a vote of the showerhead task force members at the July joint harmonization task force meeting. The commenter also stated that the marking requirement is misleading to consumers since it is only one data point and does not account for the infinite combinations of supply pressures and distribution system variations. It is meaningless in retrofit situations unless the consumer also replaces the valve. The commenter also suggested that consumers would not understand the purpose of the value, what to do with the information, or they may not even know how to determine their shower valves compatability with the showerhead based on this information.

Response: WaterSense disagrees with this comment and has decided to keep this marking requirement in the specification. Although the task force may decide ultimately not to include this requirement in the ASME A112.18.1/CSA B125.1 standard, WaterSense has determined that for its purposes this marking requirement is necessary in order to begin addressing the plumbing system component compatibility issues and ultimately in educating consumers on how to effectively mitigate the relative risks of plumbing products so that they can make informed purchasing decisions.

XI. Supporting Statement

Cost Analysis

a. One commenter suggested adding a cost-effectiveness calculation for a new construction and normal replacement scenario in addition to the existing cost-effectiveness calculation, which depicts an early retirement scenario. A cost-effectiveness evaluation for a new construction or normal replacement scenario would be useful for program managers, builders, consumers, and other interested parties. The commenter also indicated that this information is important, as a typically large number

of units are sold for new construction and normal replacement scenarios than for early retirement scenarios.

Response: WaterSense agrees with this comment and has updated the supporting statement to include an analysis of the water and energy savings and cost-effectiveness associated with installing a WaterSense labeled showerhead under normal replacement and new construction scenarios.